

# *Significant Difference in the Level of Acceptability Among the Accreditation Task Force Toward the Web-Based System for Engineering Programs Accreditation of Bicol University, Albay, Philippines*

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**Abstract**— The study aims to come up with a web-based system for engineering program accreditation for the BU College of Engineering to help faculty members who encounter difficulties, particularly in accessing and retrieving documents.

Web applications, as the name implies, are software programs hosted on remote servers and accessed via web browsers. In contrast, cloud-based applications offer enhanced functionalities and broader compatibility. A web-based application was chosen over a cloud-based one because the development cost is less. The format design of the system is based on the 10 areas of the survey instrument of the AACUP. The documents gathered and collected were uploaded to the web-based system. These documents are made accessible to accreditors, the chairman, and faculty members, guided by a user's manual and approval of accounts by the system administrator's user guide. The WordPress (an open-source content management system) and BlueHost (a web hosting domain) were used to develop the system. Furthermore, the system was designed using the Agile software development method, using programming languages, specifically, HTML, CSS, Javascript, and PHP. There are two major types of users of the system: 1) public users composed of the accreditors, chairman, and faculty members; and 2) administrators of the system. Access to the Web-Based System for Engineering Programs Accreditation requires a registered user account to be approved by the system administrator. The software is evaluated using the eight (8) criteria of ISO 25010 software quality evaluation. Using a Likert scale consisting of four points with 4 as the highest rating with adjectival rating of Strongly Agree (SA) and 1 as the lowest for Strongly Disagree (SD), results show that the evaluation of the respondents for functionality, reliability, usability, efficiency, maintainability, portability, security, and compatibility ranges from 3.80 to 3.92. The over-all result of the evaluation of the system, a weighted mean of 3.87 suggests that the overall performance is relatively high. In this case, the result indicates a favorable assessment across multiple dimensions, indicating a strong adherence to the ISO 25010 model's standards and requirements.

**Keywords**—Significant difference, accreditation task force, accreditation, web-based system, engineering programs

## I. INTRODUCTION

Accreditation remains one of the most widely used approaches in assessing quality assurance systems in Higher Education Institutions (HEIs). For both public and private tertiary institutions, it is a standard means to improve curricular programs. In the Philippines, to evaluate higher education programs, the Commission on Higher Education (CHED) recognized accreditation as one of the essential tools.

Across different countries, various state and public accreditation systems for professional tertiary education have been established with a common purpose: to uphold educational quality in degree programs and ensure that graduates achieve a high level of competence [1]. The Accreditation Board for Engineering and Technology (ABET) is one of the most widely known accrediting bodies in the United States for quality assurance in engineering education.

The Accrediting Agency of Chartered Colleges and Universities in the Philippines (AACUP) is one of the two accrediting bodies formed under the National Network of Quality Accrediting Agencies (NNQAA) to assist government-owned institutions in the Philippine context. According to [2], AACUP, Inc. is a non-stock, non-profit organization established in 1987 with the primary purpose of accrediting state universities and colleges. The agency views accreditation as a process of evaluating the academic operations of tertiary institutions through an independent assessment. This is intended to determine whether an institution is effectively achieving its objectives and maintaining standards comparable to similar institutions. At present, AACUP has 111 State Universities and Colleges (SUCs) as members.

The AACUP accreditation system involves three major components. The first is the member SUCs, the second is AACUP itself, which formulates quality assurance instruments, trains accreditors, and organizes accreditation activities, and the third is the pool of accreditors composed of experts and qualified faculty members from member SUCs.

## II. RELATED WORK

### A. Accreditation in Higher Education

The accreditation process follows several stages. It begins with the filing of an application by the SUC together with the payment of the required accreditation and membership fees [3], [4]. Approval of the application does not automatically mean that accreditation has been granted, nor does it assure eventual success. Usually, a survey visit is scheduled one to two years after the application is approved. During this preparation period, the institution conducts an internal self-survey or self-assessment through its own internal accreditors. This stage indicates that the institution is preparing itself for accreditation. After this, a preliminary survey visit is conducted by external accreditors to assess the program for the first time. Only after passing this stage does the institution formally proceed to the actual accreditation process [5], [6], [7], [8]. Once qualified, the institution is granted candidate status, which is valid for two years. The first survey visit leads to Level I accreditation, the second survey visit grants Level II re-accredited status valid for five years, the third survey visit confers Level III accreditation, and the fourth survey visit may lead to institutional accreditation, which is the highest status an institution can attain.

Considering the difficulties experienced by personnel during accreditation, along with the uncertainty of obtaining a successful result, there is a clear need for a system that can manage and organize the documents required for accreditation and assessment. Many of the common problems faced by accreditation task forces may be addressed through a developed web-based system. As a data management platform, such a system can store essential accreditation documents in an organized and secure manner. It also allows users with registered accounts to access, retrieve, and download files anytime and anywhere. Moreover, documents can be arranged according to the criteria set by the AACUP instrument, making them easier to locate and review. Missing files can be identified immediately through the database, while issues related to unclear task dissemination can be minimized because assignments may be designated according to specific areas of responsibility. In a way, the system can help assess program readiness more efficiently while reducing the time, effort, and financial resources required for accreditation.

The primary objective of this study is to determine the significant difference in the level of acceptability among the accreditation task force, which is intended to determine whether members of the accreditation task force vary in their assessment of the developed web-based accreditation system [9]. The system was developed to support the accreditation of engineering programs at Bicol University by improving the organization, storage, and retrieval of accreditation documents. This objective helps to determine whether the task force shares a common view on the system's acceptability or whether there are differences in their assessment. The system is acceptable across users if the responses are generally consistent. However, the system needs further improvement to better address the needs of all members involved in the accreditation process if significant differences exist.

When it comes to quality assurance in higher education, accreditation is considered one of the tools commonly used. In the Philippine context, institutional accountability, continuous improvement, and outcomes-based education quality assurance are strongly linked to quality assurance. CHED Memorandum Order No. 46, series of 2012, emphasized the need for a quality assurance framework that is outcomes-based and typology-based, thereby encouraging higher education institutions to maintain systems that can demonstrate program effectiveness and institutional performance [10], and it highlights the significance of the accreditation process of credible records, accessible evidence, and organized documentation.

The role of accrediting agencies in the Philippines is to evaluate programs through external review. Accreditation in the country functions as a voluntary but highly valued process for maintaining educational quality and encouraging institutional development according to Conchada and Tiongco [11]. Their review pointed out that although accreditation promotes quality enhancement, institutions often face operational difficulties related to compliance requirements, coordination, and documentation. This observation is important because it suggests that accreditation is not only a matter of meeting standards, but also of developing institutional systems that make compliance more efficient and manageable [11].

For state universities and colleges, AACUP serves as one of the principal accrediting bodies. A university accreditation guide used in the Philippine SUC setting states that the survey instrument is program-specific and consists of ten areas or criteria with benchmark statements that guide accreditors in evaluating compliance [12]. These areas generally cover vision, mission, goals and objectives; faculty; curriculum and instruction; support to students; research; extension and community involvement; library; physical plant and facilities; laboratories; and administration [12], [13]. Because each area requires numerous documentary evidences, accreditation work becomes both document-intensive and time-sensitive, especially during survey visits and preparation periods.

### B. Web-Based Systems for Document Management

The shift from manual to digital processes has led many institutions to adopt web-based systems for managing records and transactions. Web-based systems are commonly used because they can be accessed through browsers, support centralized data storage, and reduce dependency on physical files. In academic environments, these features are especially useful because records are usually handled by several offices and users at the same time. When properly designed, a web-based platform can improve accessibility, reduce redundancy, and support faster retrieval of needed documents [14].

A web-based approach is particularly appropriate when users need to access records remotely and at different levels of authorization. Compared with purely manual systems, web-based applications allow multiple users to retrieve information without handling physical folders and can support role-based access, centralized organization, and easier updating of files.

These characteristics make such systems suitable for accreditation environments where accreditors, chairpersons, and faculty members need timely access to documentary evidences while maintaining administrative control [9]

In higher education, document management systems have been developed to address recurring problems such as misplaced files, duplication of records, delayed transmission of documents, and difficulty in tracking updates. Estrera reported that an electronic document management system for a higher education institution was introduced after identifying weaknesses in the tracking, keeping, and transferring of files. The study noted that document loss and redundancy were among the major concerns that justified the development of a centralized digital system [15]. This finding is relevant to accreditation work because the same problems often arise when institutions prepare evidence for multiple areas of evaluation.

### C. Software Quality Evaluation

The evaluation of software quality requires a recognized framework that can measure whether a system is acceptable to its users and fit for its intended purpose. ISO/IEC 25010:2011 provides one of the most widely accepted models for software product quality. According to the standard, software quality may be assessed through eight characteristics: functional suitability, performance efficiency, compatibility, usability, reliability, security, maintainability, and portability [16]. Because these characteristics address both technical performance and user experience, the model is widely used in the evaluation of newly developed information systems.

The use of ISO/IEC 25010 is appropriate for web-based academic systems because such systems are expected not only to function correctly, but also to be secure, accessible, and easy to maintain. In the context of an accreditation platform, functionality refers to whether the system allows users to upload, retrieve, and organize documents as intended. Reliability and security are also important because accreditation files are institutional records that must remain accurate and protected. Usability matters as well, particularly when users have different levels of technical familiarity. Thus, ISO/IEC 25010 provides a comprehensive basis for determining whether a web-based accreditation system meets the expectations of its intended users [16].

Several applied studies have examined whether different groups of respondents vary in their evaluation of software systems. Pamplona and Dela Cruz developed a Web-Based Strategic Performance Management System for President Ramon Magsaysay State University and evaluated it using the ISO/IEC 25010:2011 metrics, along with measures of acceptability and readiness. Their study compared staff and supervisor assessments and reported that the system was rated "Excellent" for software quality and "Highly Acceptable" for acceptability. Despite comparing two respondent groups, the study found no significant difference in their evaluations of software quality and in the measured domains of functional suitability, performance efficiency, compatibility, usability, reliability, security, maintainability, and portability [17]. This study is relevant because it shows that software evaluation may

produce comparable perceptions across user groups even when the respondents have different institutional roles.

A similar result was reported by Ali in Web-Based Enrollment System: An Evaluation, which assessed the web-based online enrollment system of Baliwasan Senior High School Stand-Alone in Zamboanga City. The study found that the system obtained an overall rating of "Very good" and that there were no significant differences in the level of quality of use as assessed by Grade 11 and Grade 12 students. More specifically, the computed p-value for the comparison between the two grade-level groups was 0.737339, which was greater than the 0.05 significance level. The study supports the idea that users from different classifications may still share similar perceptions of system quality when the platform performs consistently across groups [18].

## III. METHODOLOGY

### A. Research Design and Instrument

This study employed a quantitative, non-experimental, descriptive-comparative research design. It was descriptive because it determined the level of acceptability of the web-based system for engineering programs' accreditation in terms of the selected software quality criteria. It was also comparative because it examined whether the responses of the accreditation task force significantly differed when respondents were grouped according to their role in the accreditation process. A non-experimental design was appropriate because the study did not manipulate the respondents' conditions and did not randomly assign them to treatment groups [19].

The developed web-based system for engineering programs accreditation was pilot tested at the BU College of Engineering (BUCENG), East Campus, Legazpi City. In this study, total enumeration of respondents was done. There were 49 respondents in this study, who were composed of faculty members, administrators, and accreditors. Specifically, these 49 respondents were composed of thirty-six (36) faculty members from the six (6) programs that were considered, eight (8) administrators that included department heads from the different programs, the associate dean, and the dean of the college, and five (5) internal accreditors. During AACUP accreditation in BUCENG, faculty members are assigned according to areas.

The main instrument of the study was a structured questionnaire based on the ISO/IEC 25010:2011 software product quality model. The instrument measured the respondents' assessment of the web-based system in terms of functional suitability, performance efficiency, compatibility, usability, reliability, security, maintainability, and portability.

The level of acceptability is determined using a Likert scale consisting of four points, with 4 as the highest rating, with adjectival rating of Strongly Agree (SA) and 1 as the lowest for Strongly Disagree (SD).

### B. Statistical Treatment of the Data

The result of the evaluation and level of acceptability was interpreted using the Chi-Square Test and the Chi-Square Test of Homogeneity.

The Chi-Square Test ( $X^2$ ) is one of the most commonly used under the Nonparametric Tests. This test does not require a normal distribution. Nonparametric tests are suitable for analyzing both nominal and ordinal data. Nominal data are categorized into distinct groups, while ordinal data are ranked according to some order or hierarchy.

The Chi-Square Test ( $X^2$ ) is a test that is used to determine if there is a significant difference between observed and expected frequencies. This nonparametric test has three functions: testing for goodness-of-fit, testing for homogeneity, and testing for independence [20].

The formula for the Chi-Square Test is given in equation (1):

$$x^2 = \sum \frac{(O-E)^2}{E} \quad (1)$$

Where:

- $x^2$  = the Chi-Square Test
- O = observed frequencies
- E = expected quantities

Chi-Square Test of Homogeneity is typically employed to compare a single categorical variable among two or more distinct populations and assess whether the frequency counts are distributed similarly across the populations.

The homogeneity test examines the null hypothesis that assumes homogeneity or equality based on certain attributes. Specifically, the chi-square test of homogeneity is employed to ascertain whether two or more independent samples differ in their distributions on a single variable. This test is commonly employed to make comparisons of different groups or conditions based on an outcome categorized by a specific criterion. The test statistic for assessing the overall significance or the omnibus test statistic is formed by combining the independence test and the homogeneity test. Despite their similarities, there are distinctions between the sampling hypotheses of these two tests. When analyzing the data, it is necessary to calculate the degrees of freedom, expected frequencies, test statistics, and P-value associated with the test statistic. Degree of freedom (DF) is equal to the following:  $DF = (r - 1) * (c - 1)$  In this formula, r is a variable and c is the level number for the other categorical variable [21].

$$x^2 = \frac{(OF-EF)^2}{EF} \quad (2)$$

For statistical analysis of the data gathered, the researchers considered the Null Hypothesis ( $H_0$ ): “there is no significant difference in the level of acceptability among accreditation task force”.

The Expected frequencies (EF) for a Chi-square test for homogeneity, individually for each respondent at each level of the categorical variable (adjectival rating), as given by the formula in equation (3):

$$E_{R,AR} = \frac{n_R}{n} * n_{AR} \quad (3)$$

where,

$E_{R,AR}$  = the expected frequency for respondents

(R) at level Adjectival Rating (AR) of the categorical variable

$n_R$  = is the number of Respondents corresponding for every row in a contingency table

$n_{AR}$  = the number of respondents corresponding for every column in a contingency table,

$n$  = the total respondents

#### IV. RESULTS AND DISCUSSION

Since the data for the expected and observed variables are the weighted for the level of acceptability of the different respondents, the researcher used a non-parametric test particularly the Chi-Square Test ( $x^2$ ) – Homogeneity.

Table I shows the summary data and presentation of the use of the Chi-Square Test of Homogeneity to determine if the null hypothesis of this study was acceptable or not. For the Expected Frequency (EF), there were a total of 36 faculty members, 28.65 of whom found the system highly acceptable, while only 7.35 found the system moderately acceptable. Among the administrators, 6.37 found the system highly acceptable, while only 1.63 found it moderately acceptable. From the accreditors, 3.98 rated the system highly acceptable, while 1.02 rated the system moderately acceptable. For the Observed Frequency (OF), there was a total of 36 faculty members, 30 of whom found the system as highly acceptable while only 6 (six) found the outcomes moderately acceptable. Among the administrators, most found the system highly acceptable while only 2 (two) found the outcomes moderately acceptable. Three of the accreditors rated the system highly acceptable while 2 (two) rated the outcomes moderately acceptable. The computed value for the Chi-square test was 1.5998.

TABLE I. TABLE OF OBSERVED FREQUENCY (OF) AND EXPECTED FREQUENCY (EF) USING CHI-SQUARE TEST OF HOMOGENEITY

Respondent s	Adjectival Rating (AR)	EF	OF	$x^2 = \sum \frac{(OF - EF)^2}{EF}$
Faculty	Highly Acceptable	28.65	30	0.0636
	Moderately Acceptable	7.35	6	0.2479
Adminis- trator	Highly Acceptable	6.37	6	0.0215
	Moderately Acceptable	1.63	2	0.0839
Accreditor	Highly Acceptable	3.98	3	0.2413
	Moderately Acceptable	1.02	2	0.9416
$x^2$				<b>1.5998</b>

If the Chi-Square computed value is less than the Chi-Square Tabular Value, accept Null Hypothesis ( $H_0$ ). Using the Critical Values of Chi-Square Level of Significance at 0.05 and degree of freedom (Df) of 2 [22] is computed as shown in Table II. Thus, the chi square critical value to be used in this study at Level of Significance ( $\alpha$ ) = 0.05 is 5.991

The Chi-Square computed value of 1.5998 is lesser than the Chi-Square Tabular Value of 5.991 at 0.05 level of significance

with 2 degrees of freedom so the null hypothesis ( $H_0$ ) is accepted. This means that there is no significant difference between the observed and the expected frequencies. In other words, there is no significant difference in the level of acceptability among the accreditation task force.

TABLE II. LEVEL OF SIGNIFICANCE

Degree of Freedom	Critical Values for Chi-Square ( $X^2$ ) - Distribution with Level of Significance ( $\alpha$ )			
Df = (R-1)*(AR-1) Df = (3-1)*(2-1)	0.10	0.05	0.02	0.01
iDf = 2	4.605	5.991	7.824	9.210

The result suggests that the members of the accreditation task force generally share a similar viewpoint or level of agreement regarding the acceptability of the web-based system under consideration. This further indicates a lack of significant discrepancies or divergent opinions among the task force members in the evaluation of the level of acceptability of the system.

### V. CONCLUSION

Based on the findings, it is concluded that there is no significant difference in the level of acceptability among the members of the accreditation task force toward the web-based system for engineering programs accreditation of Bicol University, Albay, Philippines. The null hypothesis is therefore accepted.

This means that the faculty, administrator, and accreditor have a generally uniform assessment of the system, indicating that the web-based system is consistently perceived as acceptable by its intended users.

Future development may focus on enhancing system features related to document organization, search functionality, user navigation, and data security to make the platform more efficient and responsive to the needs of accreditors, administrators, and faculty members.

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